



SEQUENCE LISTING

<110> Bakaletz, Lauren O.  
Cohen, Joseph  
Dequesne, Guy  
Lobet, Yves

<120> Vaccine

<130> B45145

<140> 09/719,379

<141> 2000-12-11

<150> PCT/US99/11980

<151> 1999-05-28

<150> GB 9812613.9

<151> 1998-06-11

<160> 81

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-10567RM

<400> 1

Arg Ser Asp Tyr Lys Phe Tyr Glu Ala Ala Asn Gly Thr Arg Asp His

1

5

10

15

Lys Lys Gly

<210> 2

<211> 22

<212> PRT

<213> Haemophilus influenzae strain ntHi-1715MEE

<400> 2

Arg Ser Asp Tyr Lys Leu Tyr Asn Lys Asn Ser Ser Ser Asn Ser Thr  
1 5 10 15  
Leu Lys Asn Leu Gly Glu  
20

<210> 3

<211> 13

<212> PRT

<213> Haemophilus influenza strain ntHi-1729MEE

<400> 3

Arg Ser Asp Tyr Lys Phe Tyr Asp Asn Lys Arg Ile Asp  
1 5 10

<210> 4

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-183NP

<400> 4

Arg Ser Asp Tyr Lys Leu Tyr Asn Lys Asn Ser Ser Thr Leu Lys Asp  
1 5 10 15  
Leu Gly Glu

<210> 5

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-1128

<400> 5

Arg Ser Asp Tyr Lys Phe Tyr Glu Asp Ala Asn Gly Thr Arg Asp His  
1 5 10 15  
Lys Lys Gly

<210> 6

<211> 19

<212> PRT

<213> Non-typable Haemophilus influenzae

<220>

<221> VARIANT

<222> 16

<223> Xaa = Any Amino Acid

<400> 6

Arg Ser Asp Tyr Lys Phe Tyr Glu Ala Pro Asn Ser Thr Arg Asp Xaa

1 5 10 15

Lys Lys Gly

<210> 7

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-152NP

<400> 7

Arg Ser Asp Tyr Lys Phe Tyr Glu Asp Ala Asp Gly Thr Arg Asp His

1 5 10 15

Lys Lys Gly

<210> 8

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-1234MEE

<400> 8

Arg Ser Asp Tyr Lys Phe Tyr Asp Asp Ala Asn Gly Thr Arg Asp His

1 5 10 15

Lys Lys Gly

<210> 9

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-90100RM

<400> 9

Arg Ser Asp Tyr Lys Phe Tyr Glu Asp Glu Asn Gly Thr Arg Asp His

1

5

10

15

Lys Lys Gly

<210> 10

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-86027NP

<400> 10

Arg Ser Asp Tyr Lys Phe Tyr Glu Val Ala Asn Gly Thr Arg Asp His

1

5

10

15

Lys Lys Gly

<210> 11

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-476

<400> 11

Arg Ser Asp Tyr Lys Phe Tyr Glu Glu Ala Asn Gly Thr Arg Asp His

1

5

10

15

Lys Lys Gly

<210> 12

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-166NP

<400> 12

Arg Ser Asp Tyr Lys Phe Tyr Asn Asp Ala Asn Gly Thr Arg Asp His

1

5

10

15

Lys Lys Ser

<210> 13  
<211> 19  
<212> PRT  
<213> Haemophilus influenzae strain ntHi-1848NP

<400> 13  
Arg Ser Asp Tyr Lys Phe Tyr Glu Val Ala Asn Gly Thr Arg Asp His  
1 5 10 15  
Lys Lys Ser

<210> 14  
<211> 19  
<212> PRT  
<213> Haemophilus influenzae strain ntHi-567

<400> 14  
Arg Ser Asp Tyr Lys Phe Tyr Glu Asp Ala Asn Gly Thr Arg Asp Arg  
1 5 10 15  
Lys Thr Gly

<210> 15  
<211> 19  
<212> PRT  
<213> Haemophilus influenzae strain ntHi-484

<400> 15  
Arg Ser Asp Tyr Lys Phe Tyr Glu Asp Ala Asn Gly Thr Arg Lys His  
1 5 10 15  
Lys Glu Gly

<210> 16  
<211> 19  
<212> PRT  
<213> Haemophilus influenzae strain ntHi-10559RM

<400> 16

Arg Ser Asp Tyr Lys Leu Tyr Glu Val Ala Asn Gly Thr Arg Asp His  
1 5 10 15  
Lys Lys Ser

<210> 17

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-601

<400> 17

Arg Ser Asp Tyr Lys Phe Tyr Glu Val Ala Asn Gly Thr Arg Asp His  
1 5 10 15  
Lys Gln Ser

<210> 18

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-226NP

<400> 18

Arg Ser Asp Tyr Lys Phe Tyr Glu Glu Ala Asn Gly Thr Arg Asp His  
1 5 10 15  
Lys Arg Ser

<210> 19

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-480

<400> 19

Arg Ser Asp Tyr Lys Phe Tyr Glu Asp Ala Asn Gly Thr Arg Glu Arg  
1 5 10 15  
Lys Arg Gly

<210> 20

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-1657MEE

<400> 20

Arg Ser Asp Tyr Lys Phe Tyr Glu Val Ala Asn Gly Thr Arg Glu Arg

1

5

10

15

Lys Lys Gly

<210> 21

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-214NP

<400> 21

Arg Ser Asp Tyr Lys Phe Tyr Glu Val Pro Asn Gly Thr Arg Asp His

1

5

10

15

Lys Gln Ser

<210> 22

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-250NP

<400> 22

Arg Ser Asp Tyr Lys Arg Tyr Glu Glu Ala Asn Gly Thr Arg Asn His

1

5

10

15

Asp Lys Gly

<210> 23

<211> 19

<212> PRT

<213> Haemophilus influenzae strain ntHi-499

<400> 23

Arg Ser Asp Tyr Glu Phe Tyr Glu Ala Pro Asn Ser Thr Arg Asp His

1

5

10

15

Lys Lys Gly

<210> 24

<211> 21

<212> PRT

<213> Haemophilus influenzae strain ntHi-492

<400> 24

Arg Ser Asp Tyr Lys Leu Tyr Asn Lys Asn Ser Ser Asn Ser Thr Leu

1

5

10

15

Lys Asn Leu Gly Glu

20

<210> 25

<211> 21

<212> PRT

<213> Haemophilus influenzae strain ntHi-502

<400> 25

Arg Ser Asp Tyr Lys Leu Tyr Asp Lys Asn Ser Ser Ser Asn Thr Leu

1

5

10

15

Lys Lys Leu Gly Glu

20

<210> 26

<211> 20

<212> PRT

<213> Haemophilus influenzae strain ntHi-165NP

<400> 26

Arg Ser Asp Tyr Lys Leu Tyr Asn Lys Asn Ser Ser Asn Thr Leu Lys

1

5

10

15

Asp Leu Gly Glu

20

<210> 27

<211> 20

<212> PRT



<213> Haemophilus influenzae strain ntHi-495

<400> 27

Arg Ser Asp Tyr Lys Leu Tyr Asn Lys Asn Ser Ser Asp Ala Leu Lys  
1 5 10 15  
Lys Leu Gly Glu  
20

<210> 28

<211> 40

<212> PRT

<213> LB1 peptide (derived from Haemophilus influenza)

<400> 28

Arg Ser Asp Tyr Lys Phe Tyr Glu Asp Ala Asn Gly Thr Arg Asp His  
1 5 10 15  
Lys Lys Gly Pro Ser Leu Lys Leu Leu Ser Leu Ile Lys Gly Val Ile  
20 25 30  
Val His Arg Leu Glu Gly Val Glu  
35 40

<210> 29

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-1128

<400> 29

cggtctgatt ataaatttta tgaagatgca aacggtactc gtgaccacaa gaaaggt 57

<210> 30

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-152NP

<400> 30

cggtctgatt ataaatttta tgaagatgca gacggtactc gtgaccacaa gaaaggt 57

<210> 31

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-1234MEE

<400> 31  
cgttctgatt ataaatttta tgatgatgca aacggtactc gtgaccacaa gaaaggt 57

<210> 32

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-90100RM

<400> 32

cgttctgatt ataaatttta tgaagatgaa aacggtactc gtgaccacaa gaaaggt 57

<210> 33

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-10567RM

<400> 33

cgttctgatt ataaatttta tgaagctgca aacggtactc gtgaccacaa gaaaggt 57

<210> 34

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-1199MEE

<400> 34

cgttctgatt ataaatttta tgaagctgca aatggtactc gtgaccacaa gaaaggt 57

<210> 35

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-86027NP

<400> 35

cgttctgatt ataaatttta tgaagttgca aacggtactc gtgaccacaa gaaaggt 57

<210> 36

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-476

<400> 36

cgttctgatt ataaatttta tgaagaagca aacggtactc gtgaccacaa gaaaggt 57

<210> 37  
<211> 57  
<212> DNA  
<213> Haemophilus influenzae strain ntHi-166NP

<400> 37  
cggttctgatt ataaatttta taatgatgca aacggtactc gtgaccacaa gaaaagt 57

<210> 38  
<211> 57  
<212> DNA  
<213> Haemophilus influenzae strain ntHi-1848NP

<400> 38  
cggttctgatt ataaatttta tgaagttgca aacggtactc gtgaccacaa gaaaagt 57

<210> 39  
<211> 57  
<212> DNA  
<213> Haemophilus influenzae strain ntHi-567

<400> 39  
cggttctgatt ataaatttta tgaagatgca aacggtactc gtgaccgcaa gacaggt 57

<210> 40  
<211> 57  
<212> DNA  
<213> Haemophilus influenzae strain ntHi-484

<400> 40  
cggttctgatt ataaatttta tgaagatgca aacggtactc gtaagcacia ggaaggt 57

<210> 41  
<211> 57  
<212> DNA  
<213> Haemophilus influenzae strain ntHi-10559RM

<400> 41  
cggttctgatt ataaacttta tgaagttgca aacggtactc gtgaccacaa gaaaagt 57

<210> 42  
<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-601

<400> 42

cgttctgatt ataaatttta tgaagttgca aacggtactc gtgaccacaa gcaaagt 57

<210> 43

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-226NP

<400> 43

cgttctgatt ataaatttta tgaagaagca aacggtactc gtgaccacaa gagaagt 57

<210> 44

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-480

<400> 44

cgttctgatt ataaatttta tgaagatgca aacggtactc gtgagcgcaa gagaggt 57

<210> 45

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-1657MEE

<400> 45

cgttctgatt ataaatttta tgaagttgca aacggtactc gtgagcgcaa gaaaggt 57

<210> 46

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-214NP

<400> 46

cgttctgatt ataaatttta tgaagttcca aacggtactc gtgaccacaa gcaaagt 57

<210> 47

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-250NP

<400> 47

cgttctgatt ataaacgtta tgaagaagca aacggtactc gtaaccacga caaaggt 57

<210> 48

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-499

<400> 48

cgttctgatt atgaatttta tgaagctcca aacagtactc gtgaccacaa gaaaggt 57

<210> 49

<211> 66

<212> DNA

<213> Haemophilus influenzae strain ntHi-1715MEE

<400> 49

cgttctgact ataaattgta caataaaaaat agtagtagta atagtactct taaaaaccta 60  
ggcgaa 66

<210> 50

<211> 63

<212> DNA

<213> Haemophilus influenzae strain ntHi-492

<400> 50

cgttctgact ataaattgta caataaaaaat agtagtaata gtactcttaa aaacctaggc 60  
gaa 63

<210> 51

<211> 63

<212> DNA

<213> Haemophilus influenzae strain ntHi-502

<400> 51

cgttctgact ataaattgta cgataaaaaat agtagtagta atactcttaa aaaactaggc 60  
gaa 63

<210> 52

<211> 57

<212> DNA

<213> Haemophilus influenzae strain ntHi-183

<400> 52

cgttctgact ataaattgta caataaaaat agtagtactc ttaaagacct aggcgaa 57

<210> 53

<211> 60

<212> DNA

<213> Haemophilus influenzae strain ntHi-165NP

<400> 53

cgttctgact ataaattgta caataaaaat agtagtaata ctcttaaaga cctaggcgaa 60

<210> 54

<211> 60

<212> DNA

<213> Haemophilus influenzae strain ntHi-495

<400> 54

cgttctgact ataaattata caataaaaat agtagtgatg ctcttaaaaa actaggcgaa 60

<210> 55

<211> 39

<212> DNA

<213> Haemophilus influenzae strain ntHi-1729MEE

<400> 55

cgttctgact ataaattcta cgataataaa cgcacgat 39

<210> 56

<211> 23

<212> DNA

<213> Primer NTHi-01

<400> 56

actgcaatcg cattagtagt tgc 23

<210> 57

<211> 22

<212> DNA

<213> Primer NTHi-02

<400> 57

ccaaatgcga aagttacatc ag

22

<210> 58

<211> 16

<212> DNA

<213> Primer NTHi-GR1

<400> 58

gtgggtcacga gtaccg

16

<210> 59

<211> 18

<212> DNA

<213> Primer NTHi-GR2bis

<400> 59

tctgtgatgt tcgcctag

18

<210> 60

<211> 20

<212> DNA

<213> Primer NTHi-GR3

<400> 60

ctatcgaatgc gtttattatc

20

<210> 61

<211> 18

<212> DNA

<213> Primer NTHi-03

<400> 61

aggttacgac gatttcgg

18

<210> 62

<211> 17

<212> DNA

<213> Primer NTHi-04

<400> 62

cgcgagttag ccattgg

17

<210> 63

<211> 19

<212> DNA

<213> Primer NTHi-05

<400> 63

aaagcaggtg ttgctttag

19

<210> 64

<211> 21

<212> DNA

<213> Primer NTHi-06

<400> 64

tactgcgtat tcttatgcac c

21

<210> 65

<211> 19

<212> DNA

<213> Primer NTHi-14

<400> 65

ggtgtatttg gtggttacc

19

<210> 66

<211> 19

<212> DNA

<213> Primer NTHi-15

<400> 66

gttacgacga ttacggtcg

19

<210> 67

<211> 28

<212> DNA

<213> Primer LB-Baka-01

<400> 67

ctagccatgg atggtggcaa agcaggtg

28

<210> 68

<211> 24

<212> DNA

<213> Primer LB-Baka-05



<400> 68  
cactagtacg tgcgttgtga cgac

24

<210> 69  
<211> 33  
<212> DNA  
<213> Primer NT1715-11NCO

<400> 69  
catgccatgg atggcggtaa agcaggtggt gct

33

<210> 70  
<211> 26  
<212> DNA  
<213> Primer NT1715-12NCO

<400> 70  
catgccatgg cacgtgctct gtgatg

26

<210> 71  
<211> 48  
<212> DNA  
<213> Primer NT1729-18SPE

<400> 71  
ctagtcgttc tgactataaa ttctacgata ataaacgcag cgatagta

48

<210> 72  
<211> 45  
<212> DNA  
<213> Primer NT1729-19SPE

<400> 72  
ctagtactat cgatgcgttt atcgtagaat ttataggcag aacga

45

<210> 73  
<211> 158  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> pMGMCs expression vector

<400> 73

```
ctcttacaca ttccagccct gaaaaagggc atcaaattaa accacacctt aaggaggata 60
taacatatgg atcccatggc cacgtgtgat cagagctcaa ctagtggcca ccatcaccat 120
caccattaat ctagaatcga taagcttcga ccgatgcc 158
```

<210> 74

<211> 1244

<212> DNA

<213> Haemophilus influenzae

<220>

<221> CDS

<222> (67)...(1212)

<400> 74

```
ctcttacaca ttccagccct gaaaaagggc atcaaattaa accacacctt aaggaggata 60
taacat atg gat cca aaa act tta gcc ctt tct tta tta gca gct ggc 108
Met Asp Pro Lys Thr Leu Ala Leu Ser Leu Leu Ala Ala Gly
```

1 5 10

```
gta cta gca ggt tgt agc agc cat tca tca aat atg gcg aat acc caa 156
Val Leu Ala Gly Cys Ser Ser His Ser Ser Asn Met Ala Asn Thr Gln
15 20 25 30
```

```
atg aaa tca gac aaa atc att att gct cac cgt ggt gct agc ggt tat 204
Met Lys Ser Asp Lys Ile Ile Ile Ala His Arg Gly Ala Ser Gly Tyr
35 40 45
```

```
tta cca gag cat acg tta gaa tct aaa gca ctt gcg ttt gca caa cag 252
Leu Pro Glu His Thr Leu Glu Ser Lys Ala Leu Ala Phe Ala Gln Gln
50 55 60
```

```
gct gat tat tta gag caa gat tta gca atg act aag gat ggt cgt tta 300
Ala Asp Tyr Leu Glu Gln Asp Leu Ala Met Thr Lys Asp Gly Arg Leu
65 70 75
```

```
gtg gtt att cac gat cac ttt tta gat ggc ttg act gat gtt gcg aaa 348
Val Val Ile His Asp His Phe Leu Asp Gly Leu Thr Asp Val Ala Lys
80 85 90
```

```
aaa ttc cca cat cgt cat cgt aaa gat ggc cgt tac tat gtc atc gac 396
Lys Phe Pro His Arg His Arg Lys Asp Gly Arg Tyr Tyr Val Ile Asp
```

95	100	105	110	
ttt acc tta aaa gaa att caa agt tta gaa atg aca gaa aac ttt gaa	444			
Phe Thr Leu Lys Glu Ile Gln Ser Leu Glu Met Thr Glu Asn Phe Glu				
115	120	125		
acc aaa gat ggc aaa caa gcg caa gtt tat cct aat cgt ttc cct ctt	492			
Thr Lys Asp Gly Lys Gln Ala Gln Val Tyr Pro Asn Arg Phe Pro Leu				
130	135	140		
tgg aaa tca cat ttt aga att cat acc ttt gaa gat gaa att gaa ttt	540			
Trp Lys Ser His Phe Arg Ile His Thr Phe Glu Asp Glu Ile Glu Phe				
145	150	155		
atc caa ggc tta gaa aaa tcc act ggc aaa aaa gta ggg att tat cca	588			
Ile Gln Gly Leu Glu Lys Ser Thr Gly Lys Lys Val Gly Ile Tyr Pro				
160	165	170		
gaa atc aaa gca cct tgg ttc cac cat caa aat ggt aaa gat att gct	636			
Glu Ile Lys Ala Pro Trp Phe His His Gln Asn Gly Lys Asp Ile Ala				
175	180	185	190	
gct gaa acg ctc aaa gtg tta aaa aaa tat ggc tat gat aag aaa acc	684			
Ala Glu Thr Leu Lys Val Leu Lys Lys Tyr Gly Tyr Asp Lys Lys Thr				
195	200	205		
gat atg gtt tac tta caa act ttc gat ttt aat gaa tta aaa cgt atc	732			
Asp Met Val Tyr Leu Gln Thr Phe Asp Phe Asn Glu Leu Lys Arg Ile				
210	215	220		
aaa acg gaa tta ctt cca caa atg gga atg gat ttg aaa tta gtt caa	780			
Lys Thr Glu Leu Leu Pro Gln Met Gly Met Asp Leu Lys Leu Val Gln				
225	230	235		
tta att gct tat aca gat tgg aaa gaa aca caa gaa aaa gac cca aag	828			
Leu Ile Ala Tyr Thr Asp Trp Lys Glu Thr Gln Glu Lys Asp Pro Lys				
240	245	250		
ggt tat tgg gta aac tat aat tac gat tgg atg ttt aaa cct ggt gca	876			
Gly Tyr Trp Val Asn Tyr Asn Tyr Asp Trp Met Phe Lys Pro Gly Ala				
255	260	265	270	
atg gca gaa gtg gtt aaa tat gcc gat ggt gtt ggc cca ggt tgg tat	924			

Met Ala Glu Val Val Lys Tyr Ala Asp Gly Val Gly Pro Gly Trp Tyr  
 275 280 285

atg tta gtt aat aaa gaa gaa tcc aaa cct gat aat att gtg tac act 972

Met Leu Val Asn Lys Glu Glu Ser Lys Pro Asp Asn Ile Val Tyr Thr  
 290 295 300

ccg ttg gta aaa gaa ctt gca caa tat aat gtg gaa gtg cat cct tac 1020

Pro Leu Val Lys Glu Leu Ala Gln Tyr Asn Val Glu Val His Pro Tyr  
 305 310 315

acc gtg cgt aaa gat gca ctg ccc gag ttt ttc aca gac gta aat caa 1068

Thr Val Arg Lys Asp Ala Leu Pro Glu Phe Phe Thr Asp Val Asn Gln  
 320 325 330

atg tat gat gcc tta ttg aat aaa tca ggg gca aca ggt gta ttt act 1116

Met Tyr Asp Ala Leu Leu Asn Lys Ser Gly Ala Thr Gly Val Phe Thr  
 335 340 345 350

gat ttc cca gat act ggc gtg gaa ttc tta aaa gga ata aaa tcc atg 1164

Asp Phe Pro Asp Thr Gly Val Glu Phe Leu Lys Gly Ile Lys Ser Met  
 355 360 365

gcc acg tgt gat cag agc tca act agt ggc cac cat cac cat cac cat 1212

Ala Thr Cys Asp Gln Ser Ser Thr Ser Gly His His His His His His  
 370 375 380

taatctagaa tcgataagct tcgaccgatg cc 1244

<210> 75

<211> 382

<212> PRT

<213> Haemophilus influenzae

<400> 75

Met Asp Pro Lys Thr Leu Ala Leu Ser Leu Leu Ala Ala Gly Val Leu  
 1 5 10 15

Ala Gly Cys Ser Ser His Ser Ser Asn Met Ala Asn Thr Gln Met Lys  
 20 25 30

Ser Asp Lys Ile Ile Ile Ala His Arg Gly Ala Ser Gly Tyr Leu Pro  
 35 40 45

Glu His Thr Leu Glu Ser Lys Ala Leu Ala Phe Ala Gln Gln Ala Asp  
 50 55 60

Tyr	Leu	Glu	Gln	Asp	Leu	Ala	Met	Thr	Lys	Asp	Gly	Arg	Leu	Val	Val	65	70	75	80
Ile	His	Asp	His	Phe	Leu	Asp	Gly	Leu	Thr	Asp	Val	Ala	Lys	Lys	Phe	85	90	95	
Pro	His	Arg	His	Arg	Lys	Asp	Gly	Arg	Tyr	Tyr	Val	Ile	Asp	Phe	Thr	100	105	110	
Leu	Lys	Glu	Ile	Gln	Ser	Leu	Glu	Met	Thr	Glu	Asn	Phe	Glu	Thr	Lys	115	120	125	
Asp	Gly	Lys	Gln	Ala	Gln	Val	Tyr	Pro	Asn	Arg	Phe	Pro	Leu	Trp	Lys	130	135	140	
Ser	His	Phe	Arg	Ile	His	Thr	Phe	Glu	Asp	Glu	Ile	Glu	Phe	Ile	Gln	145	150	155	160
Gly	Leu	Glu	Lys	Ser	Thr	Gly	Lys	Lys	Val	Gly	Ile	Tyr	Pro	Glu	Ile	165	170	175	
Lys	Ala	Pro	Trp	Phe	His	His	Gln	Asn	Gly	Lys	Asp	Ile	Ala	Ala	Glu	180	185	190	
Thr	Leu	Lys	Val	Leu	Lys	Lys	Tyr	Gly	Tyr	Asp	Lys	Lys	Thr	Asp	Met	195	200	205	
Val	Tyr	Leu	Gln	Thr	Phe	Asp	Phe	Asn	Glu	Leu	Lys	Arg	Ile	Lys	Thr	210	215	220	
Glu	Leu	Leu	Pro	Gln	Met	Gly	Met	Asp	Leu	Lys	Leu	Val	Gln	Leu	Ile	225	230	235	240
Ala	Tyr	Thr	Asp	Trp	Lys	Glu	Thr	Gln	Glu	Lys	Asp	Pro	Lys	Gly	Tyr	245	250	255	
Trp	Val	Asn	Tyr	Asn	Tyr	Asp	Trp	Met	Phe	Lys	Pro	Gly	Ala	Met	Ala	260	265	270	
Glu	Val	Val	Lys	Tyr	Ala	Asp	Gly	Val	Gly	Pro	Gly	Trp	Tyr	Met	Leu	275	280	285	
Val	Asn	Lys	Glu	Glu	Ser	Lys	Pro	Asp	Asn	Ile	Val	Tyr	Thr	Pro	Leu	290	295	300	
Val	Lys	Glu	Leu	Ala	Gln	Tyr	Asn	Val	Glu	Val	His	Pro	Tyr	Thr	Val	305	310	315	320
Arg	Lys	Asp	Ala	Leu	Pro	Glu	Phe	Phe	Thr	Asp	Val	Asn	Gln	Met	Tyr	325	330	335	
Asp	Ala	Leu	Leu	Asn	Lys	Ser	Gly	Ala	Thr	Gly	Val	Phe	Thr	Asp	Phe	340	345	350	
Pro	Asp	Thr	Gly	Val	Glu	Phe	Leu	Lys	Gly	Ile	Lys	Ser	Met	Ala	Thr	355	360	365	
Cys	Asp	Gln	Ser	Ser	Thr	Ser	Gly	His	His	His	His	His	His			370	375	380	

<211> 1325

<212> DNA

<213> Haemophilus influenza

<220>

<221> CDS

<222> (67)...(1293)

<400> 76

ctcttacaca ttccagccct gaaaaagggc atcaaattaa accacacctt aaggaggata 60  
taacat atg gat cca aaa act tta gcc ctt tct tta tta gca gct ggc 108  
Met Asp Pro Lys Thr Leu Ala Leu Ser Leu Leu Ala Ala Gly  
1 5 10

gta cta gca ggt tgt agc agc cat tca tca aat atg gcg aat acc caa 156  
Val Leu Ala Gly Cys Ser Ser His Ser Ser Asn Met Ala Asn Thr Gln  
15 20 25 30

atg aaa tca gac aaa atc att att gct cac cgt ggt gct agc ggt tat 204  
Met Lys Ser Asp Lys Ile Ile Ile Ala His Arg Gly Ala Ser Gly Tyr  
35 40 45

tta cca gag cat acg tta gaa tct aaa gca ctt gcg ttt gca caa cag 252  
Leu Pro Glu His Thr Leu Glu Ser Lys Ala Leu Ala Phe Ala Gln Gln  
50 55 60

gct gat tat tta gag caa gat tta gca atg act aag gat ggt cgt tta 300  
Ala Asp Tyr Leu Glu Gln Asp Leu Ala Met Thr Lys Asp Gly Arg Leu  
65 70 75

gtg gtt att cac gat cac ttt tta gat ggc ttg act gat gtt gcg aaa 348  
Val Val Ile His Asp His Phe Leu Asp Gly Leu Thr Asp Val Ala Lys  
80 85 90

aaa ttc cca cat cgt cat cgt aaa gat ggc cgt tac tat gtc atc gac 396  
Lys Phe Pro His Arg His Arg Lys Asp Gly Arg Tyr Tyr Val Ile Asp  
95 100 105 110

ttt acc tta aaa gaa att caa agt tta gaa atg aca gaa aac ttt gaa 444  
Phe Thr Leu Lys Glu Ile Gln Ser Leu Glu Met Thr Glu Asn Phe Glu  
115 120 125

acc aaa gat ggc aaa caa gcg caa gtt tat cct aat cgt ttc cct ctt 492

Thr Lys Asp Gly Lys Gln Ala Gln Val Tyr Pro Asn Arg Phe Pro Leu	
130	140
tgg aaa tca cat ttt aga att cat acc ttt gaa gat gaa att gaa ttt	540
Trp Lys Ser His Phe Arg Ile His Thr Phe Glu Asp Glu Ile Glu Phe	
145	155
atc caa ggc tta gaa aaa tcc act ggc aaa aaa gta ggg att tat cca	588
Ile Gln Gly Leu Glu Lys Ser Thr Gly Lys Lys Val Gly Ile Tyr Pro	
160	170
gaa atc aaa gca cct tgg ttc cac cat caa aat ggt aaa gat att gct	636
Glu Ile Lys Ala Pro Trp Phe His His Gln Asn Gly Lys Asp Ile Ala	
175	190
gct gaa acg ctc aaa gtg tta aaa aaa tat ggc tat gat aag aaa acc	684
Ala Glu Thr Leu Lys Val Leu Lys Lys Tyr Gly Tyr Asp Lys Lys Thr	
195	205
gat atg gtt tac tta caa act ttc gat ttt aat gaa tta aaa cgt atc	732
Asp Met Val Tyr Leu Gln Thr Phe Asp Phe Asn Glu Leu Lys Arg Ile	
210	220
aaa acg gaa tta ctt cca caa atg gga atg gat ttg aaa tta gtt caa	780
Lys Thr Glu Leu Leu Pro Gln Met Gly Met Asp Leu Lys Leu Val Gln	
225	235
tta att gct tat aca gat tgg aaa gaa aca caa gaa aaa gac cca aag	828
Leu Ile Ala Tyr Thr Asp Trp Lys Glu Thr Gln Glu Lys Asp Pro Lys	
240	250
ggt tat tgg gta aac tat aat tac gat tgg atg ttt aaa cct ggt gca	876
Gly Tyr Trp Val Asn Tyr Asn Tyr Asp Trp Met Phe Lys Pro Gly Ala	
255	270
atg gca gaa gtg gtt aaa tat gcc gat ggt gtt ggc cca ggt tgg tat	924
Met Ala Glu Val Val Lys Tyr Ala Asp Gly Val Gly Pro Gly Trp Tyr	
275	285
atg tta gtt aat aaa gaa gaa tcc aaa cct gat aat att gtg tac act	972
Met Leu Val Asn Lys Glu Glu Ser Lys Pro Asp Asn Ile Val Tyr Thr	
290	300

ccg ttg gta aaa gaa ctt gca caa tat aat gtg gaa gtg cat cct tac 1020  
 Pro Leu Val Lys Glu Leu Ala Gln Tyr Asn Val Glu Val His Pro Tyr  
 305 310 315

acc gtg cgt aaa gat gca ctg ccc gag ttt ttc aca gac gta aat caa 1068  
 Thr Val Arg Lys Asp Ala Leu Pro Glu Phe Phe Thr Asp Val Asn Gln  
 320 325 330

atg tat gat gcc tta ttg aat aaa tca ggg gca aca ggt gta ttt act 1116  
 Met Tyr Asp Ala Leu Leu Asn Lys Ser Gly Ala Thr Gly Val Phe Thr  
 335 340 345 350

gat ttc cca gat act ggc gtg gaa ttc tta aaa gga ata aaa tcc atg 1164  
 Asp Phe Pro Asp Thr Gly Val Glu Phe Leu Lys Gly Ile Lys Ser Met  
 355 360 365

gat ggt ggc aaa gca ggt gtt gct tta gta cgt tct gat tat aaa ttt 1212  
 Asp Gly Gly Lys Ala Gly Val Ala Leu Val Arg Ser Asp Tyr Lys Phe  
 370 375 380

tat gaa gat gca aac ggt act cgt gac cac aag aaa ggt cgt cac aca 1260  
 Tyr Glu Asp Ala Asn Gly Thr Arg Asp His Lys Lys Gly Arg His Thr  
 385 390 395

gca cgt act agt ggc cac cat cac cat cac cat taatctagaa tcgataagct 1313  
 Ala Arg Thr Ser Gly His His His His His His  
 400 405

tcgaccgatg cc 1325

<210> 77  
 <211> 409  
 <212> PRT  
 <213> Haemophilus influenza

<400> 77  
 Met Asp Pro Lys Thr Leu Ala Leu Ser Leu Leu Ala Ala Gly Val Leu  
 1 5 10 15  
 Ala Gly Cys Ser Ser His Ser Ser Asn Met Ala Asn Thr Gln Met Lys  
 20 25 30  
 Ser Asp Lys Ile Ile Ile Ala His Arg Gly Ala Ser Gly Tyr Leu Pro  
 35 40 45  
 Glu His Thr Leu Glu Ser Lys Ala Leu Ala Phe Ala Gln Gln Ala Asp



50		55		60
Tyr Leu Glu Gln Asp	Leu Ala Met Thr Lys Asp Gly Arg Leu Val Val			
65	70	75	80	
Ile His Asp His Phe	Leu Asp Gly Leu Thr Asp Val Ala Lys Lys Phe			
	85	90	95	
Pro His Arg His Arg Lys Asp Gly Arg Tyr Tyr Val Ile Asp Phe Thr				
	100	105	110	
Leu Lys Glu Ile Gln Ser Leu Glu Met Thr Glu Asn Phe Glu Thr Lys				
	115	120	125	
Asp Gly Lys Gln Ala Gln Val Tyr Pro Asn Arg Phe Pro Leu Trp Lys				
	130	135	140	
Ser His Phe Arg Ile His Thr Phe Glu Asp Glu Ile Glu Phe Ile Gln				
145	150	155	160	
Gly Leu Glu Lys Ser Thr Gly Lys Lys Val Gly Ile Tyr Pro Glu Ile				
	165	170	175	
Lys Ala Pro Trp Phe His His Gln Asn Gly Lys Asp Ile Ala Ala Glu				
	180	185	190	
Thr Leu Lys Val Leu Lys Lys Tyr Gly Tyr Asp Lys Lys Thr Asp Met				
	195	200	205	
Val Tyr Leu Gln Thr Phe Asp Phe Asn Glu Leu Lys Arg Ile Lys Thr				
	210	215	220	
Glu Leu Leu Pro Gln Met Gly Met Asp Leu Lys Leu Val Gln Leu Ile				
225	230	235	240	
Ala Tyr Thr Asp Trp Lys Glu Thr Gln Glu Lys Asp Pro Lys Gly Tyr				
	245	250	255	
Trp Val Asn Tyr Asn Tyr Asp Trp Met Phe Lys Pro Gly Ala Met Ala				
	260	265	270	
Glu Val Val Lys Tyr Ala Asp Gly Val Gly Pro Gly Trp Tyr Met Leu				
	275	280	285	
Val Asn Lys Glu Glu Ser Lys Pro Asp Asn Ile Val Tyr Thr Pro Leu				
	290	295	300	
Val Lys Glu Leu Ala Gln Tyr Asn Val Glu Val His Pro Tyr Thr Val				
305	310	315	320	
Arg Lys Asp Ala Leu Pro Glu Phe Phe Thr Asp Val Asn Gln Met Tyr				
	325	330	335	
Asp Ala Leu Leu Asn Lys Ser Gly Ala Thr Gly Val Phe Thr Asp Phe				
	340	345	350	
Pro Asp Thr Gly Val Glu Phe Leu Lys Gly Ile Lys Ser Met Asp Gly				
	355	360	365	
Gly Lys Ala Gly Val Ala Leu Val Arg Ser Asp Tyr Lys Phe Tyr Glu				
370	375	380		
Asp Ala Asn Gly Thr Arg Asp His Lys Lys Gly Arg His Thr Ala Arg				
385	390	395	400	

Thr Ser Gly His His His His His His

405

<210> 78

<211> .1442.

<212> DNA

<213> Haemophilus influenzae

<220>

<221> CDS

<222> (67)...(1411)

<400> 78.

ctcttacaca ttccagccct gaaaaagggc atcaaattaa accacacctt aaggaggata 60  
taacat atg gat cca aaa act tta gcc ctt tct tta tta gca gct ggc 108

Met Asp Pro Lys Thr Leu Ala Leu Ser Leu Leu Ala Ala Gly

1

5

10

gta cta gca ggt tgt agc agc cat tca tca aat atg gcg aat acc caa 156

Val Leu Ala Gly Cys Ser Ser His Ser Ser Asn Met Ala Asn Thr Gln

15

20

25

30

atg aaa tca gac aaa atc att att gct cac cgt ggt gct agc ggt tat 204

Met Lys Ser Asp Lys Ile Ile Ile Ala His Arg Gly Ala Ser Gly Tyr

35

40

45

tta cca gag cat acg tta gaa tct aaa gca ctt gcg ttt gca caa cag 252

Leu Pro Glu His Thr Leu Glu Ser Lys Ala Leu Ala Phe Ala Gln Gln

50

55

60

gct gat tat tta gag caa gat tta gca atg act aag gat ggt cgt tta 300

Ala Asp Tyr Leu Glu Gln Asp Leu Ala Met Thr Lys Asp Gly Arg Leu

65

70

75

gtg gtt att cac gat cac ttt tta gat ggc ttg act gat gtt gcg aaa 348

Val Val Ile His Asp His Phe Leu Asp Gly Leu Thr Asp Val Ala Lys

80

85

90

aaa ttc cca cat cgt cat cgt aaa gat ggc cgt tac tat gtc atc gac 396

Lys Phe Pro His Arg His Arg Lys Asp Gly Arg Tyr Tyr Val Ile Asp

95

100

105

110

ttt acc tta aaa gaa att caa agt tta gaa atg aca gaa aac ttt gaa	444
Phe Thr Leu Lys Glu Ile Gln Ser Leu Glu Met Thr Glu Asn Phe Glu	
115 120 125	
acc aaa gat ggc aaa caa gcg caa gtt tat cct aat cgt ttc cct ctt	492
Thr Lys Asp Gly Lys Gln Ala Gln Val Tyr Pro Asn Arg Phe Pro Leu	
130 135 140	
tgg aaa tca cat ttt aga att cat acc ttt gaa gat gaa att gaa ttt	540
Trp Lys Ser His Phe Arg Ile His Thr Phe Glu Asp Glu Ile Glu Phe	
145 150 155	
atc caa ggc tta gaa aaa tcc act ggc aaa aaa gta ggg att tat cca	588
Ile Gln Gly Leu Glu Lys Ser Thr Gly Lys Lys Val Gly Ile Tyr Pro	
160 165 170	
gaa atc aaa gca cct tgg ttc cac cat caa aat ggt aaa gat att gct	636
Glu Ile Lys Ala Pro Trp Phe His His Gln Asn Gly Lys Asp Ile Ala	
175 180 185 190	
gct gaa acg ctc aaa gtg tta aaa aaa tat ggc tat gat aag aaa acc	684
Ala Glu Thr Leu Lys Val Leu Lys Lys Tyr Gly Tyr Asp Lys Lys Thr	
195 200 205	
gat atg gtt tac tta caa act ttc gat ttt aat gaa tta aaa cgt atc	732
Asp Met Val Tyr Leu Gln Thr Phe Asp Phe Asn Glu Leu Lys Arg Ile	
210 215 220	
aaa acg gaa tta ctt cca caa atg gga atg gat ttg aaa tta gtt caa	780
Lys Thr Glu Leu Leu Pro Gln Met Gly Met Asp Leu Lys Leu Val Gln	
225 230 235	
tta att gct tat aca gat tgg aaa gaa aca caa gaa aaa gac cca aag	828
Leu Ile Ala Tyr Thr Asp Trp Lys Glu Thr Gln Glu Lys Asp Pro Lys	
240 245 250	
ggt tat tgg gta aac tat aat tac gat tgg atg ttt aaa cct ggt gca	876
Gly Tyr Trp Val Asn Tyr Asn Tyr Asp Trp Met Phe Lys Pro Gly Ala	
255 260 265 270	
atg gca gaa gtg gtt aaa tat gcc gat ggt gtt ggc cca ggt tgg tat	924
Met Ala Glu Val Val Lys Tyr Ala Asp Gly Val Gly Pro Gly Trp Tyr	
275 280 285	

atg tta gtt aat aaa gaa gaa tcc aaa cct gat aat att gtg tac act	972
Met Leu Val Asn Lys Glu Glu Ser Lys Pro Asp Asn Ile Val Tyr Thr	
290 295 300	
ccg ttg gta aaa gaa ctt gca caa tat aat gtg gaa gtg cat cct tac	1020
Pro Leu Val Lys Glu Leu Ala Gln Tyr Asn Val Glu Val His Pro Tyr	
305 310 315	
acc gtg cgt aaa gat gca ctg ccc gag ttt ttc aca gac gta aat caa	1068
Thr Val Arg Lys Asp Ala Leu Pro Glu Phe Phe Thr Asp Val Asn Gln	
320 325 330	
atg tat gat gcc tta ttg aat aaa tca ggg gca aca ggt gta ttt act	1116
Met Tyr Asp Ala Leu Leu Asn Lys Ser Gly Ala Thr Gly Val Phe Thr	
335 340 345 350	
gat ttc cca gat act ggc gtg gaa ttc tta aaa gga ata aaa tcc atg	1164
Asp Phe Pro Asp Thr Gly Val Glu Phe Leu Lys Gly Ile Lys Ser Met	
355 360 365	
gat ggc ggt aaa gca ggt gtt gct tta gtt cgt tct gac tat aaa ttg	1212
Asp Gly Gly Lys Ala Gly Val Ala Leu Val Arg Ser Asp Tyr Lys Leu	
370 375 380	
tac aat aaa aat agt agt agt aat agt act ctt aaa aac cta ggc gaa	1260
Tyr Asn Lys Asn Ser Ser Ser Asn Ser Thr Leu Lys Asn Leu Gly Glu	
385 390 395	
cat cac aga gca cgt gcc atg gat ggt ggc aaa gca ggt gtt gct tta	1308
His His Arg Ala Arg Ala Met Asp Gly Gly Lys Ala Gly Val Ala Leu	
400 405 410	
gta cgt tct gat tat aaa ttt tat gaa gat gca aac ggt act cgt gac	1356
Val Arg Ser Asp Tyr Lys Phe Tyr Glu Asp Ala Asn Gly Thr Arg Asp	
415 420 425 430	
cac aag aaa ggt cgt cac aca gca cgt act agt ggc cac cat cac cat	1404
His Lys Lys Gly Arg His Thr Ala Arg Thr Ser Gly His His His His	
435 440 445	
cac cat t aatctagaat cgataagctt cgaccgatgc c	1442
His His	

<210> 79  
 <211> 448  
 <212> PRT  
 <213> Haemophilus influenzae

<400> 79

Met	Asp	Pro	Lys	Thr	Leu	Ala	Leu	Ser	Leu	Leu	Ala	Ala	Gly	Val	Leu
1				5					10					15	
Ala	Gly	Cys	Ser	Ser	His	Ser	Ser	Asn	Met	Ala	Asn	Thr	Gln	Met	Lys
			20					25					30		
Ser	Asp	Lys	Ile	Ile	Ile	Ala	His	Arg	Gly	Ala	Ser	Gly	Tyr	Leu	Pro
		35					40					45			
Glu	His	Thr	Leu	Glu	Ser	Lys	Ala	Leu	Ala	Phe	Ala	Gln	Gln	Ala	Asp
	50					55				60					
Tyr	Leu	Glu	Gln	Asp	Leu	Ala	Met	Thr	Lys	Asp	Gly	Arg	Leu	Val	Val
65					70					75					80
Ile	His	Asp	His	Phe	Leu	Asp	Gly	Leu	Thr	Asp	Val	Ala	Lys	Lys	Phe
			85						90					95	
Pro	His	Arg	His	Arg	Lys	Asp	Gly	Arg	Tyr	Tyr	Val	Ile	Asp	Phe	Thr
			100					105					110		
Leu	Lys	Glu	Ile	Gln	Ser	Leu	Glu	Met	Thr	Glu	Asn	Phe	Glu	Thr	Lys
		115					120					125			
Asp	Gly	Lys	Gln	Ala	Gln	Val	Tyr	Pro	Asn	Arg	Phe	Pro	Leu	Trp	Lys
	130					135					140				
Ser	His	Phe	Arg	Ile	His	Thr	Phe	Glu	Asp	Glu	Ile	Glu	Phe	Ile	Gln
145					150					155					160
Gly	Leu	Glu	Lys	Ser	Thr	Gly	Lys	Lys	Val	Gly	Ile	Tyr	Pro	Glu	Ile
			165						170				175		
Lys	Ala	Pro	Trp	Phe	His	His	Gln	Asn	Gly	Lys	Asp	Ile	Ala	Ala	Glu
		180						185					190		
Thr	Leu	Lys	Val	Leu	Lys	Lys	Tyr	Gly	Tyr	Asp	Lys	Lys	Thr	Asp	Met
		195					200					205			
Val	Tyr	Leu	Gln	Thr	Phe	Asp	Phe	Asn	Glu	Leu	Lys	Arg	Ile	Lys	Thr
	210					215					220				
Glu	Leu	Leu	Pro	Gln	Met	Gly	Met	Asp	Leu	Lys	Leu	Val	Gln	Leu	Ile
225					230					235					240
Ala	Tyr	Thr	Asp	Trp	Lys	Glu	Thr	Gln	Glu	Lys	Asp	Pro	Lys	Gly	Tyr
			245						250					255	
Trp	Val	Asn	Tyr	Asn	Tyr	Asp	Trp	Met	Phe	Lys	Pro	Gly	Ala	Met	Ala
		260						265					270		

Glu Val Val Lys Tyr Ala Asp Gly Val Gly Pro Gly Trp Tyr Met Leu  
 275 280 285  
 Val Asn Lys Glu Glu Ser Lys Pro Asp Asn Ile Val Tyr Thr Pro Leu  
 290 295 300  
 Val Lys Glu Leu Ala Gln Tyr Asn Val Glu Val His Pro Tyr Thr Val  
 305 310 315 320  
 Arg Lys Asp Ala Leu Pro Glu Phe Phe Thr Asp Val Asn Gln Met Tyr  
 325 330 335  
 Asp Ala Leu Leu Asn Lys Ser Gly Ala Thr Gly Val Phe Thr Asp Phe  
 340 345 350  
 Pro Asp Thr Gly Val Glu Phe Leu Lys Gly Ile Lys Ser Met Asp Gly  
 355 360 365  
 Gly Lys Ala Gly Val Ala Leu Val Arg Ser Asp Tyr Lys Leu Tyr Asn  
 370 375 380  
 Lys Asn Ser Ser Ser Asn Ser Thr Leu Lys Asn Leu Gly Glu His His  
 385 390 395 400  
 Arg Ala Arg Ala Met Asp Gly Gly Lys Ala Gly Val Ala Leu Val Arg  
 405 410 415  
 Ser Asp Tyr Lys Phe Tyr Glu Asp Ala Asn Gly Thr Arg Asp His Lys  
 420 425 430  
 Lys Gly Arg His Thr Ala Arg Thr Ser Gly His His His His His His  
 435 440 445

<210> 80  
 <211> 1490  
 <212> DNA  
 <213> Haemophilus influenzae

<220>  
 <221> CDS  
 <222> (67)...(1458)

<400> 80  
 ctcttacaca ttccagccct gaaaaagggc atcaaattaa accacacctt aaggaggata 60  
 taacat atg gat cca aaa act tta gcc ctt tct tta tta gca gct ggc 108  
 Met Asp Pro Lys Thr Leu Ala Leu Ser Leu Leu Ala Ala Gly  
 1 5 10  
 gta cta gca ggt tgt agc agc cat tca tca aat atg gcg aat acc caa 156  
 Val Leu Ala Gly Cys Ser Ser His Ser Ser Asn Met Ala Asn Thr Gln  
 15 20 25 30

atg aaa tca gac aaa atc att att gct cac cgt ggt gct agc ggt tat 204  
 Met Lys Ser Asp Lys Ile Ile Ile Ala His Arg Gly Ala Ser Gly Tyr  
                   35                                  40                                  45

tta cca gag cat acg tta gaa tct aaa gca ctt gcg ttt gca caa cag 252  
 Leu Pro Glu His Thr Leu Glu Ser Lys Ala Leu Ala Phe Ala Gln Gln  
                   50                                  55                                  60

gct gat tat tta gag caa gat tta gca atg act aag gat ggt cgt tta 300  
 Ala Asp Tyr Leu Glu Gln Asp Leu Ala Met Thr Lys Asp Gly Arg Leu  
                   65                                  70                                  75

gtg gtt att cac gat cac ttt tta gat ggc ttg act gat gtt gcg aaa 348  
 Val Val Ile His Asp His Phe Leu Asp Gly Leu Thr Asp Val Ala Lys  
                   80                                  85                                  90

aaa ttc cca cat cgt cat cgt aaa gat ggc cgt tac tat gtc atc gac 396  
 Lys Phe Pro His Arg His Arg Lys Asp Gly Arg Tyr Tyr Val Ile Asp  
                   95                                  100                                  105                                  110

ttt acc tta aaa gaa att caa agt tta gaa atg aca gaa aac ttt gaa 444  
 Phe Thr Leu Lys Glu Ile Gln Ser Leu Glu Met Thr Glu Asn Phe Glu  
                                   115                                  120                                  125

acc aaa gat ggc aaa caa gcg caa gtt tat cct aat cgt ttc cct ctt 492  
 Thr Lys Asp Gly Lys Gln Ala Gln Val Tyr Pro Asn Arg Phe Pro Leu  
                   130                                  135                                  140

tgg aaa tca cat ttt aga att cat acc ttt gaa gat gaa att gaa ttt 540  
 Trp Lys Ser His Phe Arg Ile His Thr Phe Glu Asp Glu Ile Glu Phe  
                   145                                  150                                  155

atc caa ggc tta gaa aaa tcc act ggc aaa aaa gta ggg att tat cca 588  
 Ile Gln Gly Leu Glu Lys Ser Thr Gly Lys Lys Val Gly Ile Tyr Pro  
                   160                                  165                                  170

gaa atc aaa gca cct tgg ttc cac cat caa aat ggt aaa gat att gct 636  
 Glu Ile Lys Ala Pro Trp Phe His His Gln Asn Gly Lys Asp Ile Ala  
                   175                                  180                                  185                                  190

gct gaa acg ctc aaa gtg tta aaa aaa tat ggc tat gat aag aaa acc 684  
 Ala Glu Thr Leu Lys Val Leu Lys Lys Tyr Gly Tyr Asp Lys Lys Thr  
                                   195                                  200                                  205

gat atg gtt tac tta caa act ttc gat ttt aat gaa tta aaa cgt atc	732
Asp Met Val Tyr Leu Gln Thr Phe Asp Phe Asn Glu Leu Lys Arg Ile	
210 215 220	
aaa acg gaa tta ctt cca caa atg gga atg gat ttg aaa tta gtt caa	780
Lys Thr Glu Leu Leu Pro Gln Met Gly Met Asp Leu Lys Leu Val Gln	
225 230 235	
tta att gct tat aca gat tgg aaa gaa aca caa gaa aaa gac cca aag	828
Leu Ile Ala Tyr Thr Asp Trp Lys Glu Thr Gln Glu Lys Asp Pro Lys	
240 245 250	
ggt tat tgg gta aac tat aat tac gat tgg atg ttt aaa cct ggt gca	876
Gly Tyr Trp Val Asn Tyr Asn Tyr Asp Trp Met Phe Lys Pro Gly Ala	
255 260 265 270	
atg gca gaa gtg gtt aaa tat gcc gat ggt gtt ggc cca ggt tgg tat	924
Met Ala Glu Val Val Lys Tyr Ala Asp Gly Val Gly Pro Gly Trp Tyr	
275 280 285	
atg tta gtt aat aaa gaa gaa tcc aaa cct gat aat att gtg tac act	972
Met Leu Val Asn Lys Glu Glu Ser Lys Pro Asp Asn Ile Val Tyr Thr	
290 295 300	
ccg ttg gta aaa gaa ctt gca caa tat aat gtg gaa gtg cat cct tac	1020
Pro Leu Val Lys Glu Leu Ala Gln Tyr Asn Val Glu Val His Pro Tyr	
305 310 315	
acc gtg cgt aaa gat gca ctg ccc gag ttt ttc aca gac gta aat caa	1068
Thr Val Arg Lys Asp Ala Leu Pro Glu Phe Phe Thr Asp Val Asn Gln	
320 325 330	
atg tat gat gcc tta ttg aat aaa tca ggg gca aca ggt gta ttt act	1116
Met Tyr Asp Ala Leu Leu Asn Lys Ser Gly Ala Thr Gly Val Phe Thr	
335 340 345 350	
gat ttc cca gat act ggc gtg gaa ttc tta aaa gga ata aaa tcc atg	1164
Asp Phe Pro Asp Thr Gly Val Glu Phe Leu Lys Gly Ile Lys Ser Met	
355 360 365	
gat ggc ggt aaa gca ggt gtt gct tta gtt cgt tct gac tat aaa ttg	1212
Asp Gly Gly Lys Ala Gly Val Ala Leu Val Arg Ser Asp Tyr Lys Leu	



370

375

380

tac aat aaa aat agt agt agt aat agt act ctt aaa aac cta ggc gaa 1260  
 Tyr Asn Lys Asn Ser Ser Ser Asn Ser Thr Leu Lys Asn Leu Gly Glu  
 385 390 395

cat cac aga gca cgt gcc atg gat ggt ggc aaa gca ggt gtt gct tta 1308  
 His His Arg Ala Arg Ala Met Asp Gly Gly Lys Ala Gly Val Ala Leu  
 400 405 410

gta cgt tct gat tat aaa ttt tat gaa gat gca aac ggt act cgt gac 1356  
 Val Arg Ser Asp Tyr Lys Phe Tyr Glu Asp Ala Asn Gly Thr Arg Asp  
 415 420 425 430

cac aag aaa ggt cgt cac aca gca cgt act agt cgt tct gac tat aaa 1404  
 His Lys Lys Gly Arg His Thr Ala Arg Thr Ser Arg Ser Asp Tyr Lys  
 435 440 445

ttc tac gat aat aaa cgc atc gat agt act agt ggc cac cat cac cat 1452  
 Phe Tyr Asp Asn Lys Arg Ile Asp Ser Thr Ser Gly His His His His  
 450 455 460

cac cat taatctagaa tcgataagct tcgaccgatg cc 1490  
 His His

&lt;210&gt; 81

&lt;211&gt; 464

&lt;212&gt; PRT

&lt;213&gt; Haemophilus influenzae.

&lt;400&gt; 81

Met Asp Pro Lys Thr Leu Ala Leu Ser Leu Leu Ala Ala Gly Val Leu  
 1 5 10 15  
 Ala Gly Cys Ser Ser His Ser Ser Asn Met Ala Asn Thr Gln Met Lys  
 20 25 30  
 Ser Asp Lys Ile Ile Ile Ala His Arg Gly Ala Ser Gly Tyr Leu Pro  
 35 40 45  
 Glu His Thr Leu Glu Ser Lys Ala Leu Ala Phe Ala Gln Gln Ala Asp  
 50 55 60  
 Tyr Leu Glu Gln Asp Leu Ala Met Thr Lys Asp Gly Arg Leu Val Val  
 65 70 75 80

Ile	His	Asp	His	Phe	Leu	Asp	Gly	Leu	Thr	Asp	Val	Ala	Lys	Lys	Phe	85	90	95
Pro	His	Arg	His	Arg	Lys	Asp	Gly	Arg	Tyr	Tyr	Val	Ile	Asp	Phe	Thr	100	105	110
Leu	Lys	Glu	Ile	Gln	Ser	Leu	Glu	Met	Thr	Glu	Asn	Phe	Glu	Thr	Lys	115	120	125
Asp	Gly	Lys	Gln	Ala	Gln	Val	Tyr	Pro	Asn	Arg	Phe	Pro	Leu	Trp	Lys	130	135	140
Ser	His	Phe	Arg	Ile	His	Thr	Phe	Glu	Asp	Glu	Ile	Glu	Phe	Ile	Gln	145	150	155
Gly	Leu	Glu	Lys	Ser	Thr	Gly	Lys	Lys	Val	Gly	Ile	Tyr	Pro	Glu	Ile	165	170	175
Lys	Ala	Pro	Trp	Phe	His	His	Gln	Asn	Gly	Lys	Asp	Ile	Ala	Ala	Glu	180	185	190
Thr	Leu	Lys	Val	Leu	Lys	Lys	Tyr	Gly	Tyr	Asp	Lys	Lys	Thr	Asp	Met	195	200	205
Val	Tyr	Leu	Gln	Thr	Phe	Asp	Phe	Asn	Glu	Leu	Lys	Arg	Ile	Lys	Thr	210	215	220
Glu	Leu	Leu	Pro	Gln	Met	Gly	Met	Asp	Leu	Lys	Leu	Val	Gln	Leu	Ile	225	230	235
Ala	Tyr	Thr	Asp	Trp	Lys	Glu	Thr	Gln	Glu	Lys	Asp	Pro	Lys	Gly	Tyr	245	250	255
Trp	Val	Asn	Tyr	Asn	Tyr	Asp	Trp	Met	Phe	Lys	Pro	Gly	Ala	Met	Ala	260	265	270
Glu	Val	Val	Lys	Tyr	Ala	Asp	Gly	Val	Gly	Pro	Gly	Trp	Tyr	Met	Leu	275	280	285
Val	Asn	Lys	Glu	Glu	Ser	Lys	Pro	Asp	Asn	Ile	Val	Tyr	Thr	Pro	Leu	290	295	300
Val	Lys	Glu	Leu	Ala	Gln	Tyr	Asn	Val	Glu	Val	His	Pro	Tyr	Thr	Val	305	310	315
Arg	Lys	Asp	Ala	Leu	Pro	Glu	Phe	Phe	Thr	Asp	Val	Asn	Gln	Met	Tyr	325	330	335
Asp	Ala	Leu	Leu	Asn	Lys	Ser	Gly	Ala	Thr	Gly	Val	Phe	Thr	Asp	Phe	340	345	350
Pro	Asp	Thr	Gly	Val	Glu	Phe	Leu	Lys	Gly	Ile	Lys	Ser	Met	Asp	Gly	355	360	365
Gly	Lys	Ala	Gly	Val	Ala	Leu	Val	Arg	Ser	Asp	Tyr	Lys	Leu	Tyr	Asn	370	375	380
Lys	Asn	Ser	Ser	Ser	Asn	Ser	Thr	Leu	Lys	Asn	Leu	Gly	Glu	His	His	385	390	395
Arg	Ala	Arg	Ala	Met	Asp	Gly	Gly	Lys	Ala	Gly	Val	Ala	Leu	Val	Arg	405	410	415
Ser	Asp	Tyr	Lys	Phe	Tyr	Glu	Asp	Ala	Asn	Gly	Thr	Arg	Asp	His	Lys			

			420					425						430			
Lys	Gly	Arg	His	Thr	Ala	Arg	Thr	Ser	Arg	Ser	Asp	Tyr	Lys	Phe	Tyr		
			435					440						445			
Asp	Asn	Lys	Arg	Ile	Asp	Ser	Thr	Ser	Gly	His	His	His	His	His	His		
			450					455						460			